

Title (en)
SYSTEM FOR CONTROLLING THE ATTITUDE OF A SPACECRAFT

Title (de)
VORRICHTUNG ZUR LAGEREGLUNG EINES RAUMFAHRZEUGES

Title (fr)
SYSTEME DE COMMANDE D'ATTITUDE D'UN VAISSEAU SPATIAL

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Application
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Abstract (en)
[origin: WO0156882A1] A system (30) for adjusting the orientation of a spacecraft adapted for use with a satellite (10). The system (30) includes a first control circuit (32, 38, 40) for canceling any momentum of the spacecraft via a counter-rotating spacecraft bus (16, 18). A second controller (32, 42, 44, 46, 48) orients the spacecraft via the application of internal spacecraft forces. In a specific embodiment, the spacecraft bus (16, 18) serves a dual use as storage section and includes a mass (16) having a moment of inertia on the same order as the moment of inertia of the satellite (10). The satellite (10) includes a bus section (16) and a payload section (14). The mass (16) includes the bus section (16). The first control circuit (32, 38, 40) runs software to selectively spin the mass (16) to cancel the momentum of the satellite (10). The software computes an actuator control signal, via a computer (32), that drives a first actuator (38) that spins the mass (16). The first control circuit (32, 38, 40) further includes a circuit for determining the inertial angular rate of the satellite (10) that includes a gyroscope sensor package (34) in communication with the computer (32). The gyroscope sensor package (34) provides a rate signal to the computer (32) that is representative of the momentum of the satellite (10). The computer (32) runs software for generating the actuator control signal in response to the receipt of the rate signal from the gyroscope sensor package (34). The second controller (32, 42, 44, 46, 48) includes a first reaction wheel (20) having an axis of rotation (26) approximately perpendicular to an axis of rotation (28) of a second reaction wheel (22). The first and second reaction wheels (20, 22) are rigidly mounted to the spacecraft bus (18, 16) and are free to spin about their respective axis. The first and second reaction wheels (20, 22) are selectively spun via first and second actuators (44, 48), respectively, in response to the receipt of first and second steering control signals, respectively.

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